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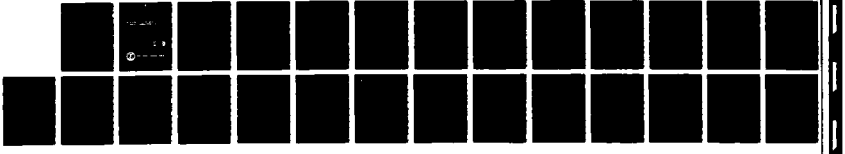

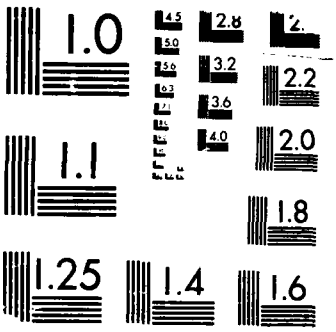

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NSWC MP 88-12

NAVAL SURFACE WARFARE CENTER TECHNOLOGY TRANSFER REPORT (FY87)

BY RAMSEY D. JOHNSON

CENTER PLANNING STAFF

1 OCTOBER 1987

NAVAL SURFACE WARFARE CENTER

Dahlgren, Virginia 22448-5000 • Silver Spring, Maryland 20903-5000

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This report describes the Naval Surface Warfare Center Technology Transfer Program and presents narrative summaries of related projects performed during FY87. A Technology Application Assessment and a listing of patents/Navy cases having commercial potential are also presented.

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FOREWORD

The Naval Surface Warfare Center (NSWC) Technology Transfer Report (FY87) has been prepared in accordance with the format and content currently specified by the Office of Naval Technology for Navy inputs in meeting the reporting requirements of the Stevenson-Wydler Technology Innovation Act of 1980 (Public Law 96-480) as amended by the Federal Technology Transfer Act of 1986 (Public Law 99-502).

The objectives of Navy domestic technology transfer are (1) to disseminate non-critical technology, originally developed in support of military applications, for potential alternative uses in the public and private sectors; and (2) to promote joint cooperative development programs that address problems of mutual concern to the Navy and other agencies or organizations. In pursuit of these objectives, the Navy transfers technical expertise to other Federal Government agencies; state and local governments; small and large businesses; nonprofit organizations; and such public service organizations as schools, hospitals, and foundations. In addition, technologies that have direct impact on the Navy mission and programs are transferred within, or into, the Navy. Transfers of hardware, software, management practices, and expertise are made in diverse fields, such as analysis and testing, communications, energy, environment, transportation, and marine technology. The Navy Domestic Technology Transfer Program provides unique services not available from, or in competition with, the private sector. Content is limited to non-militarily critical technical material that is approved for public release.

The transfer process functions as a "two-way street" and thus also serves to infuse the Navy R&D community with new ideas, techniques, and information from outside sources. The underlying philosophy and approach is to derive national benefits through technology transfer by capitalizing on recent scientific developments to promote technical and economic growth within the U.S.

A substantial portion of the information in the Appendices of this report was contributed by NSWC technical staff members engaged in Center technology transfer tasks. Questions or requests for additional information should be referred to NSWC, Code D21, Mr. Ramsey D. Johnson, (301) 394-1505 or Autovon 290-1505.

Approved by:

M. J. Tino

M. J. TINO
Associate Technical Director

CONTENTS

1. ORGANIZATIONAL STRUCTURE FOR TECHNOLOGY TRANSFER

a. Background. From a historical perspective, NSWC has been involved in technology transfer activities even prior to participating as a charter member of the Department of Defense Technology Transfer Consortium in 1971. This organization has subsequently evolved into the Federal Laboratory Consortium, of which NSWC continues to be a contributing member. NSWC's role is necessarily limited since its R&D efforts are principally directed toward Navy requirements in the national security arena. Consequently, considerations of security classification and export control of unclassified critical technologies can severely constrain the release of technical information on an unrestricted basis. Furthermore, the work is often intrinsically oriented to naval applications, and considerable adaptive engineering (necessitating non-DoD funding sources and redirection of in-house resource allocations from mission areas) would be required to redirect the R&D to non-Navy uses. Within these general constraints, NSWC endorses and pursues technology transfer activities involving Center-wide R&D efforts.

b. Program Implementation.

(1) Management. The Center's domestic technology transfer policy is administered by the Center Planning Staff (Code D21). The staff provides advanced planning information on matters impacting the role, mission, and long-term commitments of the Center. Policy implementation vehicles for technology transfer include the Center's Office of Research and Technology Applications (ORTA), the Navy/Industry Cooperative Research and Development (NICRAD) Program, and the Federal Laboratory Consortium for Technology Transfer. The Industry Independent Research and Development (IR&D) Program is also a contributor to technology transfer activities, since the transfer process can involve a two-way exchange between Government and non-government organizations. The IR&D Program serves to inform government technologists about industry-initiated research and it also serves as a mechanism for government researchers to appraise the progress and relevance of industry-initiated efforts. Guidance regarding technology transfer constraints is provided by the Militarily Critical Technologies List (MCTL), and the Center contributes to the technical review of export license applications received by the Navy Office of Technology Transfer and Security Assistance (NAVOTTSA, OP-623). Technology transfer management functions include:

(a) coordinating the program within the Center;

(b) maintaining external liaison (with the Office of Chief of Naval Research, the Federal Laboratory Consortium for Technology Transfer, the Department of Commerce, other Federal agencies, state and local governments, universities, and private industry);

(c) preparing Technology Application Assessments;

(d) assisting potential user organizations in formulating their problems;

(e) providing and disseminating information on Federally owned or originated products, processes, and services having potential application to state and local governments and private industry;

(f) providing technical assistance in response to requests from state and local governments;

(g) functioning as Center coordinator for MCTL matters; and

(h) serving as Center focal point for review of Navy-related export license applications.

(2) Technical Effort.

(a) Project Work. Directly attributable and quantifiable technology transfer work performed by Center technical departments is generally represented by those projects funded by other Government (non-DoD) sponsors and private parties (excluding that effort funded under DoD contracts). This type of effort, identified as project work, has manpower and funding allocations that are directed towards a specific objective or requirement per sponsor request.

(b) Technological Disclosures. In its role as a major Government R&D center, NSWC also serves as a significant contributor to Federal technology transfer in a more generic nature via technological disclosures in the open literature such as patents, reports, journals, and participation in symposia. The benefits from this type of activity accrete as spin-offs from DoD mission-related projects that are supported by Federal R&D appropriations. Although it is less tangibly measurable than technology transfer contributions of direct project work involving end-products, the long-term benefits are more highly promising since they provide the innovative community with a broad spectrum of new stimuli to promote economic, technical, and quality-of-life growth in the private and public sectors.

(3) Navy-wide Services. The Center also manages, edits, and publishes the "Navy Technology Transfer Fact Sheet." This monthly publication highlights Navy-wide technology and developments that have the appropriate approval for public release and are of potential benefit to public and private organizations, individuals, and other Federal laboratories. The program is sponsored by the Office of Naval Technology (Code ONT-263) to provide a highly visible source and focus for the dissemination of domestic technology transfer contributions from the Navy laboratory community.

c. Program Funding Source. A summary of FY87 funding support for management activities and project work performed by the Center is presented below:

	FY87 ($K)
(1) Administrative Functions	
ORTA	25
Other Technology Transfer	25
Technical Publications Division	180
(2) Technical Projects	
Engineering Department	474
Weapons Systems Department	12
Protection Systems Department	11
Strategic Systems Department	40
Research and Technology Department	67
Underwater Systems Department	47
Total	881

d. The following technology transfer related policy directives are in effect at NSWC:

(1) NAVSWCINST 5700.2A of 6 Jan 1986; Subj: Office of Research and Technology Applications (ORTA). The purpose of this instruction is to establish the Center ORTA.

(2) NAVSWCINST 3900.3 of 13 October 1981; Subj: Industry Independent Research and Development (IR&D) Program.

(3) NAVSWCINST 3900.1A of 22 December 1981; Subj: Navy/Industry Cooperative Research and Development (NICRAD) Program. The purpose of this instruction is to establish procedures for processing NICRAD agreements in accordance with NAVMATINST 3900.14. The NICRAD Program is technically not an element of the Navy's Domestic Technology Transfer Program. Frequently it involves the exchange of sensitive and classified information to authorized contractors. Nevertheless, transfer of technology is involved. Therefore, for administrative purposes this program is included as a functional element of the NSWC Technology Transfer Program.

e. The Center point-of-contact for ORTA/Technology Transfer, the IR&D Program, and the NICRAD program is Mr. Ramsey D. Johnson, Code D21, (301) 394-1505 or Autovon 290-1505.

2. ACCOMPLISHMENTS AND CURRENT EFFORTS SUMMARY

a. Narrative summaries of NSWC technology transfer related projects involving FY87 effort are presented in Appendix A.

b. The following report, which describes recent Center accomplishments, efforts, and technology transfer related resources, was published for public release:

NSWC MP 87-30, Naval Surface Weapons Center Technology Transfer Biennial Report (FY85/86).

c. One FY87 Technology Application Assessment was submitted to the Office of Naval Technology as input for the Department of Commerce, National Technical Information Service. This item involves photographic print processing technology and is described in Appendix B.

3. INFORMATION DISSEMINATION AND WORKING RELATIONSHIPS

a. NSWC is a member of the Federal Laboratory Consortium for Technology Transfer and participates in meetings, symposia, and exhibits related to technology transfer activities involving the Navy, state and local governments, and private industry.

b. NSWC publishes and contributes to the "Navy Technology Transfer Fact Sheet." FY87 inputs to this document are listed below:

(1) New Method Improves Pollution Control Devices

(2) Computer Software More Reliable

(3) Digital Dosimeter Measures Radiation Doses

(4) Photographic Indicator Flashes Print Status

c. NSWC has prepared an exhibit to publicize and promote the "Navy Technology Transfer Fact Sheet." This exhibit is displayed and manned at conventions such as the American Society for Naval Engineers (ASNE) and the National League of Cities. New subscribers are identified to expand the diverse range of scientists, engineers, and municipalities which participate in the information exchange medium. In FY87, the exhibit was presented at the following conventions:

(1) ASNE Convention; Biloxi, Mississippi; October 1986

(2) National League of Cities; San Antonio, Texas; December 1986

(3) Navy Micro Convention; Virginia Beach, Virginia; May 1987

d. In April 1987, NSWC representives conducted a Navy/NSWC panel discussion on the Navy's potential contractor program (NICRAD) at the MegaMarketplace East/West Conference held at the Washington, D.C. Convention Center. MegaMarketplace is national in scope and designed to increase marketing and procurement opportunities for women business owners by direct information and assistance interactions with public and private sector representatives. MegaMarketplace was sponsored by the State of New Jersey, the Department of Commerce, and the National Association of Women Business Owners.

e. NSWC entered into the following NICRAD Program Policy Agreements in FY87:

Company	Agreement Title
(1) Honeywell Inc., Marine Systems Div.	Navy Standard Computer Co-Processing Research
(2) Raytheon Co., Missile Systems Div.	Local/Short Range Anti-Air Warfare Surface Weapons System

Company	Agreement Title
(3) AT&T Federal Systems	Short Range AAW Processing & Interface Requirements
(4) Westinghouse Electric Corp., Marine Div.	Advanced Missile Launch & Handling Technologies for Naval Applications
(5) Shenandoah Systems Company, Inc.	Mine Warfare Requirements
(6) LTV Missiles & Electronics Group, Missiles Div.	Ship Self Defense System (SSDS); Short Range AAW
(7) Magnavox Signaal Systems Company	Radar Systems Technology
(8) Chamberlain Manufacturing Corp., R&D Div.	Directional Effects Warhead
(9) General Dynamics Pomona Division	Short Range Anti-Air Warfare Combat System
(10) FMC Corp., Northern Ordnance Div.	Short Range AAW Systems Analysis & Design
(11) Syscon Corporation	SRAAW Sensor System Options Review
(12) Hercules Aerospace Co., McGregor, Texas	Short Range Anti-Aircraft Weapon System
(13) Hercules Aerospace Co., Allegany Ballistics Lab.	Short Range Anti-Aircraft Weapon System
(14) Martin Marietta Corp., Orlando, FL	Directed Energy Weapons Anti-ship Missile Defense
(15) Epoch Engineering, Inc.	Ship-Launched Anti-Torpedo Weapon Studies
(16) ORI, Inc.	Charged Particle Beam Technology Review & Assessment
(17) Project Engineering, Inc.	Navy Requirements Study
(18) Barlows, Inc., Advanced Measurement Sys. Div.	Review of Shielded Enclosure Isolation Requirements
(19) Martin Marietta Corp., Baltimore Aerospace	Conduct Demo Tests of Underwater Attachment Device
(20) Gould Inc., Ocean Systems Div.	Mine Detection & Localization Studies

f. In FY87, there were 38 inventions and patent disclosures by NSWC with potential technology transfer applications. These are listed in Appendix C. NSWC also contributed approximately 560 unrestricted information disclosures via various media such as symposia, workshops, journals, and other publications.

g. In 1987, 56 NSWC technical publications were entered into the National Technical Information Service (NTIS) data base.

h. In support of Government and academic institutions, the NSWC ORTA responded to requests for technical information from the following organizations:

(1) Pennsylvania Technical Assistance Program (PENNTAP) (shape-memory alloys: NITINOL for orthodontics)

(2) Oak Ridge Associated Universities (firearms/explosives safety and training)

(3) Bureau of Mines (radiation measurement: digital dosimeter)

(4) U.S. Naval Academy (technology transfer/intellectual property rights)

(5) U.S. Army Harry Diamond Laboratories (EMP/radiation hardening)

i. The NSWC ORTA responded to technical information requests from individuals and private industry in the following technology areas:

(1) Infrared sensors

(2) Infrared decoys/flares

(3) Energy conservation (thermostat)

(4) Battery electrodes

(5) Software reliability analysis

(6) Local Area Network (LAN) communications

(7) Pollution control (fly ash filtration)

(8) Radiation monitoring (digital dosimeter)

(9) Semiconductor manufacturing equipment

(10) Magnetic detection

(11) Magnetostrictive materials

(12) Galvanic corrosion (valves)

(13) Eddy current nondestructive inspection

(14) Thermal Analysis Facility (use and capabilities)

j. Numerous inquiries are made directly to Center staff members within the various technical departments. The resultant responses significantly contribute to the Center's technology transfer process, although they are not identified and reported individually within the formal ORTA function.

APPENDIX A

NARRATIVE SUMMARIES FOR NSWC FY87 TECHNOLOGY TRANSFER RELATED PROJECTS

1. MANUFACTURING TECHNOLOGY

a. The Navy Manufacturing Technology Program requires that technology transfer to the private sector and Government agencies be a major activity of each funded project. Accordingly, upon completion each project is required to have an end-of-project demonstration for potential users or vendors, and to issue a final report. In both instances, efforts are made to disseminate the information to the widest possible audience. However, some of the information is classified and some is unclassified but all is associated with critical, sensitive technologies. This information is not releasable for public information and such requests are individually assessed based on distribution restrictions. Each project manager is encouraged to actively communicate with interested parties during the project to transfer the developing technology.

b. In addition to technical project work, NSWC also provides technical and administrative program support to the Office of Naval Acquisition Support and the Naval Sea Systems Command for manufacturing technology programs in cost benefit tracking, combat systems, and robotics.

c. The following Manufacturing Technology projects are ongoing at NSWC:

(1) Multicolor epitaxial thin-film infrared detectors

(2) Reinforced lead acid battery grids

(3) Metal Matrix Composites (MMCs)

(a) Continuous MMCs

(b) Discontinuous MMCs

(c) Space structures applications

(4) Mechanically alloyed aluminum

2. SPACE SHUTTLE STUDY

NSWC accepted a task from NASA (Marshall Space Flight Center) to evaluate the Space Shuttle Range Safety System (RSS) performance to predict the theoretical breakup phenomena and provide debris catalogs for NASA's evaluation of debris footprints. The principal phases of the study are to:

a. Provide a breakup analysis of the Solid Rocket Booster (SRB) independent of interaction with the External Tanks (ET), and also investigate SRB/ET interaction.

b. Analyze the breakup of the orbiter vehicle as a result of range safety action for the active and inactive conditions of the ET Range Safety System.

c. Use these airblast and fragmentation effects along with the destruct effects of the active system on board the ET to analyze the total breakup phenomena for various times in flight.

3. GEOSAT DATA FOR NASA

The Navy's GEOSAT program provides the dense global grid of satellite altimetry data required to improve the determination of the earth's gravitational field. A secondary mission is the timely detection of mesoscale oceanographic features. In FY87, NASA funded NSWC to provide a subset of the GEOSAT data localized to the land-based ice sheets of Greenland and Antarctica. NASA's objective is to use this altimetry data to accurately map the coastal ice cliffs and observe their seaward motion.

4. UNDERSEA WEAPONS TANK

NSWC provides an underwater testing facility for the use of Federal agencies and industry. NSWC's Undersea Weapons Tank is 50 feet in diameter and 100 feet deep. A major feature is the retrieving platform or false bottom, operating to the 100 foot depth and providing quick recovery of the test units. There are six viewing platforms around the outside of the tank. During FY87, test services were supplied to NOAA to support polluted water diving tests, and to a number of contractors who used the facility to test various systems.

5. TOURMALINE GAGES

a. The original tourmaline gage was designed and developed under Navy contract at Woods Hole Oceanographic Institute during World War II. These gages are used to measure shock wave phenomena from underwater explosions. After the war, scientists formed Crystal Research Company to market the gage; the company closed in 1972. NSWC purchased the company assets and began producing gages to fill the void left by the defunct company. Improvements have been made to the gages in relation to evolving technology.

b. NSWC constructs and calibrates the gages which are sold at fixed price to various Government and industry research activities. Gages and related information are exchanged with foreign governments with whom the U.S. has information exchange agreements. Gage purchasers in FY86 and FY87 include the Department of Interior (Bureau of Mines), Elda Trading Corp., Battelle, IREECO Chemicals, Gulf Oil Chemicals, Nitrochem Energy Corp., and Safety Consulting Engineers.

6. UNDERWATER EXPLOSION EFFECTS ON MARINE LIFE

a. Oil drilling platforms located in navigable waters should be removed after they have served their purpose. Left in place, they present obstructions to general navigation was well as to net fishing operations. The process of removal is most efficiently begun by explosively severing the platform legs some distance beneath the ambient bottom. An explosive charge is detonated inside the hollow supports that descend into the sea bottom. This operation should be carried out with little or no deleterious effect on local marine life.

b. Under Department of Interior sponsorship, NSWC initiated a project in FY87 which will analyze underwater explosive measurements to help identify the threat to marine life found near oil platform legs. The investigation will include scale model tests for comparison of confined and unconfined explosive effects.

7. U.S. COAST GUARD DIVING EQUIPMENT PROGRAM

The Coast Guard Diving Program was initiated in 1977 for the purpose of bringing Coast Guard diving equipment and procedures into conformance with Navy standards. The effort is sponsored by both the Coast Guard's Environmental Response Office and Engineering Office. By 1980, Coast Guard diving equipment and procedures met Navy requirements. The primary effort since that time has been to provide technical support in the areas of design, development, selection, and installation of diving equipment. In FY85 support was provided in the design and installation of two shipboard diver's air systems, the safety survey of diving units, and the purchase of a variety of diving equipment. FY86 support included design of a high pressure air system for the Coast Guard Dive Team, and the selection and purchase of a variety of diving tools and equipment. NSWC's effort in the Coast Guard Diving Program was completed at the end of FY87.

8. DEPARTMENT OF TRANSPORTATION (COAST GUARD) SUPPORT

NSWC conducted Structural Test Firings (STF) on-board USCGC WMEC 901 class ships during FY86. The STF Program insures that the ships meet safety and structural requirements in the 76mm gun blast areas. NSWC also conducted additional test firings on board WMEC to gather data on carbon monoxide ingress into ship compartments.

9. SYSTEMS RESEARCH CENTER AT VIRGINIA POLYTECHNICAL INSTITUTE AND STATE UNIVERSITY (VPI/SU)

a. In 1983, NSWC, the Naval Sea Systems Command (NAVSEA), and VPI/SU established a Systems Research Center (SRC) at the university under NAVSEA sponsorship. SRC conducts research jointly with, and in support of, the scientific staff at NSWC. In FY86/87, there have been 18 active projects within SRC; 10 were started in FY87. Of the 18 projects, NSWC sponsored 14 with total FY87 funding of $727K.

b. The SRC is designed to provide cooperative involvement of NSWC and VPI/SU in designated RDT&E projects from basic research and exploratory development to advanced development and finally to engineering development. The plan calls for concepts or ideas to be generated by NSWC or SRC, or jointly. Primary work is done by the SRC during the research stage, then transitioned to NSWC

(sometimes including its contractors) as the project moves through its development phases. The research activities associated with SRC add to the scope and breadth of the university's research program, and produce additional facilities and educational and research opportunities for both faculty and students. SRC also strengthens and expands the association of the Navy and the university. This joint effort emphasizes computer science and computing technology, key elements in modern naval applications.

10. COMPUTER SCIENCE RESEARCH CONSORTIUM

a. The Computer Science Department at VPI/SU has formed a Computer Science Research Consortium (CSRC) Program to strengthen existing interactions and create new professional interactions between VPI/SU professors and the Government and industry technical community. NSWC is a member of this consortium and provides a representative for CSRC's steering committee. Mutual benefits of the program include:

(1) Providing a resource of quality graduates to academia, industry, and Government

(2) Promoting Government/academia personnel exchanges

(3) Providing feedback for orienting teaching requirements toward real-life applications

(4) Providing an increased awareness of outside requirements to help focus academic research efforts.

b. During 1987, the Consortium sponsored the following events that promoted technology transfers:

(1) A semiannual newsletter containing articles on current research activities

(2) A two-day Computer User's Conference on Office Information Systems, April 11-12, 1987.

(3) A catalog of technical reports from Virginia Polytechnical Institute's Computer Science Department.

11. HIGH ALTITUDE PARACHUTE DEPLOYMENT

a. In FY87, NSWC contributed consulting services and, in some cases, technical assistance to the following industrial firms/university in the areas of aerodynamics, structures, packing, and deployment:

(1) TASC, Inc.

(2) Defense Systems, Inc.

(3) Paraflight, Inc.

(4) University of Minnesota

(5) Lockheed-Sunnyvale

b. NSWC published the following reports related to parachute technology:

(1) Notes on a Parachute Opening Force Analysis Applied to a Vertical Toward-the-Earth Trajectory, NSWC TR 87-96, May 1987.

(2) "Notes on a Generic Parachute Opening Force Analysis," in Proceedings of the AIAA Conference, Oct 1986 (paper based on NSWC TR 86-142, 1 Mar 1986), also published as AIAA paper 86-2440, same title.

APPENDIX B

NSWC FY87 TECHNOLOGY APPLICATION ASSESSMENT

Title	Lab No.
Print Status Indicator	NSWC-TAA-87-001

TECHNOLOGY APPLICATION ASSESSMENT

1. Laboratory Naval Surface Warfare Center

2. Contact (ORTA) Ramsey D. Johnson
   Phone (301) 394-1505 Autovon 290-1505

3. Address 10901 New Hampshire Avenue
   Silver Spring, MD 20903-5000

4. Technology Name Photographic Print Processing

5. Technology Type: (a) Process (b) Apparatus (c) Material
   (d) Service (e) Study (f) Other: Device

6. Users: (a) Federal Government (b) State Government
   (c) Local Government (d) Small Industry (e) Medium Industry
   (f) Large Industry (g) Consultant (h) Other:

A. Date: 9/30/87
B. CUFT #:
C. LAB #: NSWC-TAA-87-001
D. Descriptors:
Print Processing

E. Applications:
Print status indicator in photographic processing systems

7. Potential Support: exclusive license, consulting, joint venture, drawings, tooling, computer prog., economic study, training, adaptive eng., other:

8. What Problem Does It Solve and How? Uses a lighted timing indicator to prevent overlapping of prints. Alerts operators of the status of the entry path of photographic processors to signal system readiness to accept another print for processing.

9. Other Uses: None identified.

10. Main Advantages: Reduces printing production costs by (1) reducing waiting time for running several prints; (2) preventing overlapping of prints (i.e., fewer remakes); and (3) indicating malfunctions in the chemical replenishment system due to sensor error.

11. Production Information: N/A

12. Descriptive Literature: Naval Technical Disclosure Bulletin, Vol. 12, No. 1, Sep 1986. (Navy Case No. 69,217)

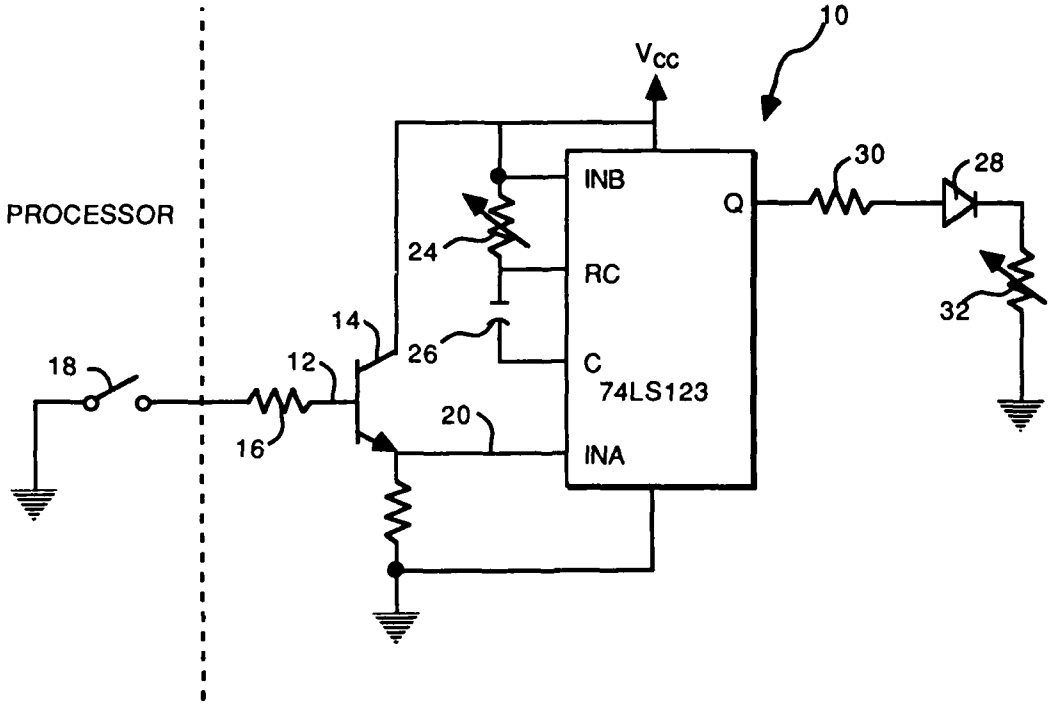
13a. Literature Available From: Ramsey D. Johnson, Code D211
Naval Surface Warfare Center
10901 New Hampshire Avenue
Silver Spring, MD 20903-5000 [Phone: (301) 394-1505]

13b. Description:

PRINT STATUS INDICATOR

The Print Status Indicator provides a means of indicating the location of photographic prints in the entry path of a roller transport-type photographic paper processor. It allows an operator to know exactly the status of the entry path of the processor and possible sensor switch malfunctions. This reduces production costs by (1) reducing waiting time for running several prints; (2) preventing overlapping of prints, thus fewer remakes are required; and (3) indicating malfunctions in the chemical replenishment system due to sensor error.

The device circuitry (below) has a normally high signal provided to the base of transistor 14 through resistor 16 by means of a rotating magnet and read switch assembly, or an optically-controlled sensor assembly disposed within the processor. Transistor 14 is an emitter-follower and, therefore, supplies a 5-volt signal to input A 20 of a timer chip 22 (74LS123). When a photographic print is inserted into the processor, transistor 14 is turned off, causing input A 20 to be 0 volts. This negative-going pulse initiates the timing cycle; the duration of the pulse is determined by resistor 24 and capacitor 26. The output of transistor 14 goes high for the duration of the timing cycle, causing LED 28 to light. The brightness of LED 28 is determined by resistors 30 and 32. The timer chip 22 (74LS123) is retriggerable so the timer is continually being restarted. The timing cycle is completed only when the print has passed the respective sensor switches 18. When LED 28 is extinguished, it is safe to insert another print into the processor. The LED "on" indicates that a print currently occupies that particular space in the feed area. The indicator lights will remain on until it is safe to insert another print into the processor.



TECHNOLOGY APPLICATION ASSESSMENT
(THIS PAGE FOR GOVERNMENT USE ONLY)

Date: 9/30/87
LAB #: NSWC-TAA-87-001

14. Principal Investigators (Name, Code, Phone): David W. Skewis, Code F13 (703) 663-8026

15. Invention Disclosure: Navy Case No. 69,217 Technology Available: Current

16. Research Began: 1986 Funding (Source, $, MYs): Unidentified

EVALUATION

17. Profit or Production Potential ..... (low) 0 (1) 2 3 4 5 (high)

18 Potential for Promoting Public Good 0 1 2 (3) 4 5

19. Priority Compared to Activities' Other Technologies ..... (0) 1 2 3 4 5

20. Evaluator: R. D. Johnson Date: 10/14/87

PROMOTION

21. Date Action Plan Developed: N/A

22. Media to be Used: Navy Technology Transfer Fact Sheet (September 1987 issue)

23. *Industries Involved or Interested:* Unknown

24. Awards: N/A

REVIEW

25. Technology Advances (include dates and re-evaluated priority): N/A

26. Information Requests (Period/No.): None

27. Successful Transfers: Unknown

APPENDIX C

NSWC FY87 INVENTIONS AND PATENTS WITH COMMERCIAL POTENTIAL

TECHNOLOGICAL AREA	NAVY CASE OR PATENT NO.	TITLE AND PURPOSE	POTENTIAL COMMERCIAL APPLICATIONS
Metal/Ceramic Composites	68,869	Method of fabricating a metal/ceramic composite structure	Ceramic-lined cylinders for automobile engines, rifle barrels
Polymers	69,301	Improved synthesis of hydroxy terminated poly(hexafluoropentanediol formal) with precise molecular weight control	Polymer coating
Semiconductors	64,724	Field effect transistor	Semiconductors
Electronic Circuits	69,489	Active filter using low gain amplification stages	Active filters
Optics	70,085	Opto-Optical beam deflector, modulator, and shaper	Optical communications
Testing Instruments	69,907	Optical position gage	Device has commercial potential in instruments for testing structural vibration, shock, and acceleration
Polymers	70,111	2,4,4,5,5,6,6-hepta fluoro-2-trifluoromethyl-3-oxaheptane-1,7-diol and method of preparation	Polymer coatings
Electrochemistry	4,654,279	Interpenetrating-network polymeric electrolytes	Room-temperature-conducting solid polymeric electrolyte for dry cells; excellent commercial potential

TECHNOLOGICAL AREA	NAVY CASE OR PATENT NO.	TITLE AND PURPOSE	POTENTIAL COMMERCIAL APPLICATIONS
Metallurgy	4,657,822	Fabrication of hollow, cored, and composite shaped parts from selected alloy powders	Excellent commercial potential; preparation of complex tubular fittings of NITINOL memory alloys; useful for weldless pipe systems
Radar	4,630,049	Digital-to-composite IFF video converter	Radar systems
Radar	4,630,048	Three hundred and sixty degree IFF video resynchronizer unit	Radar systems
Computers	4,631,662	Scanning alarm electronic processor	For increasing throughput of pipeline computing systems
Computers	4,635,182	Apparatus for controlling multiple time-varying processes	Process controls in automated factories
Intrusion Detectors	4,639,902	Near ultrasonic pattern comparison intrusion detector	Intrusion detectors
Digital Electronics	4,641,254	Test set for a navigational satellite receiver	A test set to test navigational satellite receivers
Radar	4,642,638	Apparatus for generating enhanced/regenerative bracket decode signals	Radar systems
Waste Disposal	4,647,371	Oil/water disperser device for use in an oil content monitor/ control system	Effluent disposal systems for discharge from ship bilges
Waste Disposal	4,649,281	Oil content monitor/control system	Effluent disposal systems for discharge from ship bilges
Hermetic Sealing	69,851	Metallization for hermetic sealing of ceramic modules	For hermetic sealing of integrated circuit chips

TECHNOLOGICAL AREA	NAVY CASE OR PATENT NO.	TITLE AND PURPOSE	POTENTIAL COMMERCIAL APPLICATIONS
Microwaves	4,665,660	Millimeter wavelength, dielectric waveguide	Having increased power output and a method of making same, increasing power handling capabilities of microwave waveguides
Semiconductors	4,671,845	Method for producing high quality germanium-germanium nitride interfaces for germanium semiconductors and devices produced thereby	Production of germanium semiconductor devices
Aerospace	4,627,586	Thrust vectoring apparatus for maneuvering missiles in flight	Remote - While the idea is primarily concerned with missile guidance, conceivably the thrust idea and body shape could have application to commercial as well as military supersonic aircraft
Counter-Terrorist	4,628,819	Disintegrating tamper mass	Good - The device has potential for use in gaining quick access through a door or wall and into an area
Anti-friction Bearings	69,662	Method of keying outer bearing race to housing	Excellent - The idea has potential for use by bearing manufacturers or machinery manufacturers for holding outer bearing races in housing
Air Conditioning	4,493,195	Air conditioning system with evaporative cooling apparatus	Air conditioning
Magnetometers	4,517,515	Magnetometer with a solid-state magnetic-field sensing means	Metal detectors

TECHNOLOGICAL AREA	NAVY CASE OR PATENT NO.	TITLE AND PURPOSE	POTENTIAL COMMERCIAL APPLICATIONS
Chemical Explosives	4,526,980	Method for the preparation of tetranitrodibenzotetrazapentalene	Ejection seats, cable cutters, etc.
Free Electron Lasers	4,543,655	Free electron laser device for scanning a spatial field	Laser scanners
Satellites	4,599,620	Method for determining the orientation of a moving platform	Satellite communications
Materials and Coatings	4,615,903	Method for melt-coating a surface	Semiconductor and other material manufacturing
Hydrodynamics	4,622,016	Tunnel wedge	Boat and ship drive systems
Filter Systems	4,634,458	Double-stage air filter	Environmentally controlled systems such as clean rooms
Batteries	4,659,994	Battery tester	Battery tester
Radar	4,698,635	Radar guidance system	Aviation guidance and warning Systems
Batteries	4,695,520	Electrochemical reserve battery	Batteries
Computer Systems	70,007	Parallel-to-serial data interface adapter	Data systems
Microwave	69,747	Resonance chamber system	Microwave oven design and testing
Physical Security	69,871	Security indicating attachment	Vaults and safes

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